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consider ourselves as respectable and useful among man's companions, and in our habits we would show the generations of culture we have received.

Leaving our plant and returning to human experience, we can summarize our view by saying that the problem of similarity of types with great structural diversity of kernel, is only soluble by influences which have had a very long period of time to work in; and the perfectness of the result attained is to be explained only upon the supposition of a very long period of intelligent selective action. It is very probable that a more intimate acquaintance with the facts concerning the development of a single domesticated plant, as gained from philological, physiological and recorded data will some time or other tend to throw some light upon the antiquity of man and the direction and extent of his migrations.

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ON THE EVOLUTION OF THE VERTEBRATA, PROGRESSIVE AND RETROGRESSIVE.[1]

BY E. D. COPE.

(Continued from page 148, February number.)

III. The Line of the Urochorda.

EMBRYOLOGICAL evidence leads us to anticipate that the primitive Vertebrata possessed nothing representative of the vertebrate skeleton beyond a chorda dorsalis. Above this axis should lie the nervous chord, and below it the nutritive and reproductive systems and their appendages. Such a type we have in its simplest form in the Branchiostoma, the representative of the division of the Acrania. In the animals of this division the mouth and anus have the usual vertebrate position, at opposite ends of the body-cavity. The Tunicata (formerly referred to the Mollusca) are now known to present a still more primitive type of Vertebrata, to which the name of Urochorda has been given. These curious, frequently sessile creatures, have a vertebrate structure during the larval stage, which they ultimately lose. They have the necessary chorda, and nervous axis with a brain, and a cerebral eye. They have at this time a tail, and are free-swimming; a peculiarity which a few of them retain throughout life (Appendicularia).[1] They differ from the Acrania in the positions of the extremities of the alimentary canal. The mouth is on the top of the anterior end of the animal, and is supposed by some anatomists to represent an open extremity of the pineal gland of other Vertebrata; while the tract represented by this body, the third ventricle of the brain, and the pituitary body of the Craniata, are the remains of the primitive œsophagus of the Urochorda. The anus in the adult tunicates is either dorsal, or it opens into the body cavity, as in the young larvæ. In Appendicularia it is ventral (Gegenbaur).

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[1] A lecture delivered before the Franklin Institute, Jan. 16, 1884. (Erratum: on p. 147, 2d line from bottom, omit "Batrachia.")

The history of the Tunicata cannot be traced by palæontologists as yet, owing to the absence of hard parts in their structure. The evidence of embryology has, however, convinced phylogenists that the ancestors of this class resembled their larvæ, and that they have as a whole undergone a remarkable degeneracy. They have passed from an active, free life to a sessile one, and have lost the characters which pertain to the life of vertebrates generally.

It was to have been anticipated, however, that all of these ancestral Tunicata did not undergo this degenerative metamorphosis, for it is to such types that we must look for the ancestors of the other Vertebrata, the Acrania and the Craniata. And here palæontology steps in and throws new light on the question. I have pointed out briefly, on another page of the NATURALIST,[2] that a second order must be added to the Urochorda, viz., the Antiarcha, in which the anus presents the same position as in the Acrania, at the posterior end of the body, while an orifice of the upper surface represents the mouth of the Tunicata. To this order is to be referred the family of the Pterichthyidæ, of which the typical genus, Pterichthys, is a well-known form of the Devonian period. This genus retained its tail, which was the cause, in connection with the presence of lateral fin-like appendages, of its having been supposed to be a fish, by Agassiz, Hugh Miller and others. It is possible that the American *Bothriolepis canadensis* lost its tail, as in the majority of Urochorda. The tunicate which approaches nearest to the Antiarcha is the arctic Chelyosoma.

From the Antiarcha to the Acrania and Craniata, then, the line is an ascending one.

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[1] See Lankester on Degeneration, Nature Series, 1880.

[2] This (March) number, 1885, under "Geology and Palæontology."

IV. THE LINE OF THE PISCES.

The fishes form various series and subseries, and the tracing of all of them is not yet practicable owing to the deficiency in our knowledge of the earliest or ancestral forms. Thus the origins of the four subclasses, Holocephali, Dipnoi, Elasmobranchii and Hyopomata, are lost in the obscurity of the early Palæozoic ages.

A comparison of the four subclasses just named shows that they are related in pairs. The Holocephali and Dipnoi have no distinct suspensory segment for the lower jaw, while the Elasmobranchii and Hyopomata have such a separate element. The latter therefore present one step in the direction of complication beyond the former, but whether the one type is descended from the other, or whether both came from a common ancestor or not, is unknown. If one type be derived from the other it is not certain which is ancestor, and whether the process has been one of advance or retrogression. The fauna of the Permian epoch throws some light on the relations of these subclasses in other respects. The order of the Ichthyotomi,[1] while belonging technically to the Elasmobranchi, presents characters of both the Dipnoi and the Hyopomata. It is so near to the Dipnoi in the characters of the skull that nothing save the presence of a free suspensor of the lower jaw prevents its entering that subclass. It indicates that the one of these divisions is descended from the other, or both from a common division which may well be the group Ichthyotomi itself. In case the Elasmobranchi have descended from the Ichthyotomi, they have undergone degeneracy, as the Ichthyotomi have a higher degree of ossification and differentiation of the bones of the skull. If they descended from a purely cartilaginous type of Dipnoi, they have advanced, in the addition of the free hyomandibular. If the Dipnoi have descended from either division, they have retrograded, in the loss of the free hyomandibular. As regards the Hyopomata, we have a clear advance over the other subclasses in the presence of the maxillary arch and the opercular apparatus.

Too little is known of the history of the subclasses, excepting the Hyopomata, for us to be able to say much of the direction of the descent of their contained orders. On the sharks some light is shed by the discovery of the genus Chlamydoselachus Garman,[1] which is apparently nearly related to the Cladodonts of the Devonian seas. This genus has more numerous branchial slits than all but two of the genera of existing sharks, and it differs from all but these two in having a more perfect articulation between the tooth-bearing bones and the cranium. Of the Hyopomata a much clearer history is accessible. It has three primary divisions or tribes which differ solely in the structure of the supports of the fins. In the first division, the Crossopterygia, the anterior limbs have numerous actinosts which are supported on a peduncle of axial bones. The posterior limbs are similar. In the second division, or Chondrostei (the sturgeons, etc.), the posterior limb remains the same, while the anterior limbs have undergone a great abbreviation in the loss of the axial bones and the reduction of the number and length of the actinosts. In the third group, or Actinopteri,[2] both limbs have undergone reduction, the actinosts in the posterior fin being almost all atrophied, while those of the fore limb are much reduced in number.

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[1] See Palæontological Bulletin No. 38, E. D. Cope, 1884, p. 572, on the genus Didymodus.

The phylogeny of these tribes is not easy to make out at present. The descent has been no doubt in the order named in time, but the starting point is yet uncertain. Thus the Chondrostei appear later in time than either of the other tribes, a history which probably only represents our ignorance. The characters of the genus Crossopholis Cope, from the American Eocene, strongly suggests that the existing forms have descended from scaled ancestors. The Crossopterygian fore limb, with its arm-like axis, tells of the origin of the first limbed vertebrates, the Batrachia, whose skull-structure, however, only permits their derivation from the Dipnoi or Holocephali. As the former subclass has the Crossopterygian fin structure, we can safely regard them as the ancestors of the Batrachia, while the Crossopterygia are a side line from a similar type, probably the Ichthyotomi, because these have a free suspensor of the lower jaw. But of the structure of the fins of the Ichthyotomi unfortunately we know nothing. If this position be true, then the successive derivation of the Chondrostei and the Hyopomata in one line is rendered probable. The modification of structure has consisted in the contraction of the supporting elements of the pectoral and ventral fins by the reduction of their numbers and length. According to palæontological history, however, the tribe with most contracted fins, Actinopteri, appeared in the Coal measures (Paleoniscidæ), or very soon after the Crossopterygia in the Devonian.

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[1] Proceedings American Assoc. Adv. Sci., 1884.

[2] Partly agrees with the Teleostei of Müller, but includes many of his Ganoidea.

The descent of the fishes in general has witnessed, then, a contraction of the limbs to a very small compass and their substitution by a system of accessory radii. This has been an ever widening divergence from the type of the higher Vertebrata, and from this standpoint, and also a view of the " loss of parts without complementary addition of other parts," may be regarded as a process of degradation.

Taking up the great division of the Actinopteri, which embraces most of the species of living fishes, we can trace the direction of descent largely by reference to their systematic relations when we have no fossils to guide us.

The three subtribes adopted by Jordan represent three series of the true fishes which indicate lines of descent. The Holostei include the remainder of the old ganoids after the subtraction of the Crossopterygia and the Chondrostei. They resemble these forms in the muscular bulbus arteriosus of the heart and in the chiasm of the optic nerves. Both of these characters are complexities which the two other divisions do not possess, and which, as descendants coming later in time, must be regarded as inferior, and therefore to that extent degenerate. Of these divisions the Physostomi approach nearest the Holostei, and are indeed not distinctly definable without exceptions. The third division, or Physoclysti, shows a marked advance beyond the others in: (1) The obliteration of the primitive trachea, or ductus pneumaticus, which connects the swim-bladder and œsophagus; (2) the advance of the ventral fins from the abdomen forwards to the throat; (3) the separation of the parietal bones by the supraoccipital; (4) the presence of numerous spinous rays in the fins; and (5) the roughening of the edges of the scales, forming the ctenoid type. There are more or less numerous exceptions to all of these characters. The changes are all further divergences from the other vertebrate classes, or away from the general line of ascent of the vertebrate series taken as a whole. The end gained is specialization, but whether the series can be called either distinctively progressive or retrogressive is not so clear. The development of osseous spines, rough scales and other weapons of defense, together with the generally superior energy and tone which prevail among the Physoclysti, characterize them as superior to the Physostomi, but their departure from the ascending line of the Vertebrata has another appearance.

The descent of the Physoclystous fishes has probably been from Holostean ancestors, both with and without the intervention of Physostomous forms. This is indicated by increase in the number of actinosts in the fins of families which have pectoral ventral fins, as in the extinct genus Dorypterus.[1]

The Physostomi display three or four distinct lines of descent. The simplest type is represented by the order Isospondyli, and palæontology indicates clearly that this order is also the oldest, as it dates from the Trias at least. In one line the anterior dorsal vertebræ have become complicated, and from an interlocking mass which is intimately connected with the sense of hearing. This series commences with the Characinidæ, passes through the Cyprinidæ, and ends with the Siluridæ. The arrangements for audition constitute a superadded complication, and to these are added in the Siluroids defensive spines and armor. Some of this order, however, are distinctly degenerate, as the soft purblind Ageniosus, and the parasitic Stegophilus and Vandellia which are nearly blind, without weapons, and with greatly reduced fins.

The next line (the Haplomi, pike, etc.) loses the præcoracoid arch and has the parietal bones separated, both characters of the Physoclysti. This group was apparently abundant during the Cretaceous period, and it may have given origin to many of the Physoclysti.

Another line also loses the præcoracoid, but in other respects diverges totally from the Physoclysti and all other Physostomi. This is the line of the eels. They next lose the connection between the scapular arch and the skull, which is followed by the loss of the pectoral fin. The ventral fin went sooner. The palatine bones and teeth disappear, and the suspensor of the lower jaw grows longer and loses its symplectic element. The opercular bones grow smaller, and some of them disappear. The ossification of most of the hyoid elements disappears, and some of their cartilaginous bases even vanish. These forms are the marine eels or Colocephali. The most extraordinary example of specialization and degeneracy is seen in the abyssal eels of the family Eurypharyngidæ. Here all the degenerate features above mentioned are present in excess, and others are added, as the loss of ossification of a part of the skull, almost total obliteration of the hyoid and scapular arches, and the semi-notochordal condition of the vertebral column, etc.

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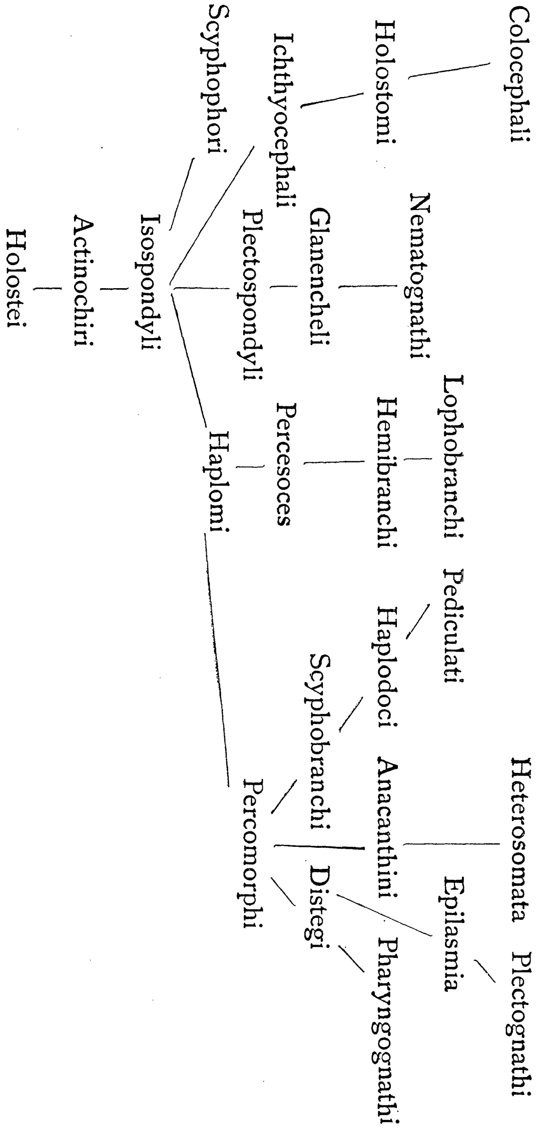
[1] See Proceeds Amer. Assoc Adv. Science, 1878, p. 297.

The Physoclysti nearest the Physostomi have abdominal ventral fins, and belong to several orders. It is such types as these that may be supposed to have been derived directly from Holostean ancestors. They appear in the Cretaceous period (Dercetidæ), along with the types that connect with the Physostomi (Haplomi). Intermediate forms between these and typical Physoclysti occur in the Eocene (Trichophanes, Erismatopterus), showing several lines of descent. The Dercetidæ belong apparently to the order Hemibranchi, while the Eocene genera named belong apparently to the Aphododiridæ, the immediate ancestor of the highest Physoclysti, the Percomorphi. The order Hemibranchi is a series of much interest. Its members lose the membrane of their dorsal spinous fin (Gasterosteidæ), and then the fin itself (Fistularia, Pegasus). The branchial apparatus has undergone, as in the eels, successive deössification (by retardation), and this in direct relation to the degree with which the body comes to be protected by bony shields, reaching the greatest defect in the Amphisilidæ. One more downward step is seen in the next succeeding order of the Lophobranchii. The branchial hyoid apparatus is reduced to a few cartilaginous pieces and the branchial fringes are much reduced in size. In the Hippocampidæ the caudal fin disappears and the tail becomes a prehensile organ by the aid of which the species lead a sedentary life. The mouth is much contracted and becomes the anterior orifice of a suctorial tube. This is a second line of unmistakable degeneracy among true fishes.

The Physoclysti with pectoral ventral fins present us with perhaps ten important ordinal or subordinal divisions. Until the palæontology of this series is better known, we shall have difficulty in constructing phylogenies. Some of the lines may, however, be made out. The accompanying diagram will assist in understanding them.

The Anacanthini present a general weakening of the organization in the less firmness of the osseous tissue and the frequent reduction in the size and character of the fins. The caudal vertebræ are of the protocercal type. As this group does not appear early in geological time, and as it is largely represented now in the abyssal ocean fauna, there is every reason to regard it as a degenerate type. The Scyphobranch line presents a specialization of the superior pharyngeal bones, which is continued by the Haplodoci (Batrachidæ). This cannot be called a degenerate line, although the fin-rays are soft. The Heterosomata (flounders)



found it convenient to lie on one side, a habit which would appear to result from a want of motive energy. The fins are very inefficient organs of movement in them, and they are certainly no rivals for swift-swimming fishes in the struggle for existence, excepting as they conceal themselves. In order to see the better while unseen, the inferior eye has turned inwards, *i. e.*, upwards, and finally has penetrated to the superior surface, so that both eyes are on one side. This peculiarity would be incredible if we did not know of its existence, and is an illustration of the extraordinary powers of accommodation possessed by nature. The Heterosomata can only be considered a degenerate group.

The double bony floor of the skull of the Distegous percomorph fishes is a complication which places them at the summit of the line of true fishes. At the summit of this division must be placed the Pharyngognathi, which fill an important role in the economy of the tropical seas, and the fresh waters of the Southern hemisphere. By means of their powerful grinding pharyngeal apparatus they can reduce vegetable and animal food inaccessible to other fishes. The result is seen in their multifarious species and innumerable individuals decked in gorgeous colors, and often reaching considerable size. This is the royal order of fishes, and there is no reason why they should not continue to increase in importance in the present fauna.

Very different is the line of the Plectognathi. The probable ancestors of this division, the Epilasmia (Chætodontidæ, etc.), are also abundant in the tropical seas, and are among the most brilliantly colored of fishes. One of their peculiarities is seen in a shortening of the brain-case and prolongation of the jaws downwards and forwards. The utility of this arrangement is probably to enable them to procure their food from the holes and cavities of the coral reefs among which they dwell. In some of the genera the muzzle has become tubular (Chelmo), and is actually used as a blow-gun by which insects are secured by shooting them with drops of water. This shortening of the basicranial axis has produced a corresponding abbreviation of the hyoid apparatus. The superior pharyngeal bones are so crowded as to have become a series of vertical plates like the leaves of a book. These characters are further developed in the Plectognathi. The brain-case is very small, the face is very elongate, and the mouth is much contracted. The bones surrounding it in each jaw are coössified.

The axial elements (femora) of the posterior fins unite together, become very elongate and lose the natatory portion. In one group (Orthagoriscidæ) the posterior part of the vertebral column is lost and the caudal fin is a nearly useless rudiment. In the Ostraciontidæ (which may have had a different origin as the pharyngeal bones are not contracted), the natatory powers are much reduced, and the body is enclosed in an osseous carapace so as to be capable of very little movement. The entire order is deficient in osseous tissue, the bones being thin and weak. It is a marked case of degeneracy.

There are several evident instances of sporadic degeneracy in other orders. One of these is the case of the family of the Icosteidæ, fishes from deep waters off the coast of California. Although members of the Percomorphi, the skeleton in the two genera Icosteus and Icichthys is unossified, and is perfectly flexible. Approximations to this state of things are seen in the parasitic genus Cyclopterus, and in the ribbon fishes, Trachypteridæ.

Thus nearly all the main lines of the Physoclysti are degenerate; the exceptions are those that terminate in the Scombridæ (mackerel), Serranidæ, and Scaridæ (Pharyngognathi).

V. THE LINE OF THE BATRACHIA.

We know Batrachia first in the coal measures. They reach a great development in the Permian epoch, and are represented by large species in the Triassic period. From that time they diminish in numbers, and at the present day form an insignificant part of the vertebrate fauna of the earth. The history of their succession is told by a table of classification, such as I give below:

I. Supraoccipital, intercalary and supratemporal bones present. Propodial bones distinct.

Vertebral centra, including atlas, segmented, one set of segments together supporting one arch..*Rachitomi.*

Vertebræ segmented, the superior and inferior segments each complete, forming two centra to each arch..*Embolomeri.*

Vertebral centra, including atlas, not segmented, one to each arch.....*Stegocephali.*

II. Supraoccipital and supratemporal bones wanting. Frontal and propodial bones distinct.

a. An os intercalare.

A palatine arch and separate caudal vertebræ..........................*Proteida.*

aa. No os intercalare.

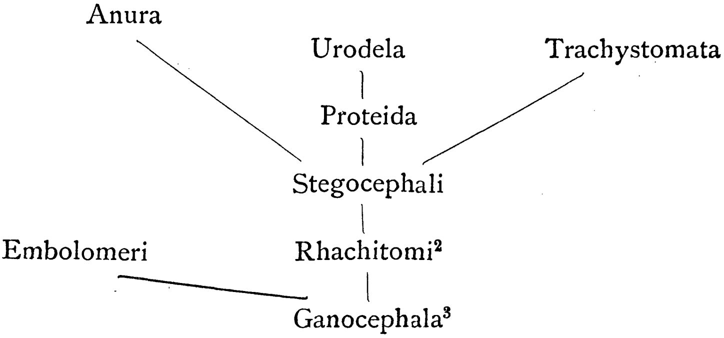
A maxillary arch; palatine arch imperfect; nasals, premaxillaries and caudal vertebræ distinct.. *Urodela.*[1]

No maxillary or palatine arches; nasals and premaxillary, also caudal vertebræ, distinct.. *Trachystomata.*

III. Supraoccipital, intercalare and supratemporal bones wanting. Frontals and parietals connate; propodial bones and caudal vertebræ confluent.

Premaxillaries distinct from nasals; no palatine arch; astragalus and calcaneum elongate, forming a distinct segment of the limb.................... *Anura.*

The probable phylogeny of these orders as imperfectly indicated by palæontology is as follows:



An examination of the above tables shows that there has been in the history of the Batrachian class a reduction in the number of the elements composing the skull, both by loss and by fusion with each other. It also shows that the vertebræ have passed from a notochordal state with segmented centra, to biconcave centra, and finally to ball and socket centra, with a great reduction of the caudal series. It is also the fact that the earlier forms (those of the Permian epoch) show the most mammalian characters of the tarsus and of the pelvis.[4] The later forms, the salamanders, show a more generalized form of carpus and tarsus and of pelvis also. In the latest forms, the Anura, the carpus and tarsus are reduced through loss of parts, except that the astragalus and calcaneum are phenomenally elongate. We have then, in the Batrachian series, a somewhat mixed kind of change; but it principally consists of concentration and consolidation of parts. The question as to whether this process is one of progression or retrogression may be answered as follows: If degeneracy consists in "the loss of parts without complementary addition of other parts," then the Batrachian line is a degenerate line. This is only partly true of the vertebral column, which presents the most primitive characters in the early, Permian, genera (Rhachitomi). If departure from the nearest approximation to the Mammalia is degeneracy, then the changes in this class come under that head. The carpus, tarsus and scapular and pelvic arches of the Rachitomi are more mammalian than are those of any of their successors.

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[1] Probably includes the Gymnophiona.

[2] Includes the Eryopidæ.

[3] Includes Trimerorhachidæ and Archegosauridæ.

[4] The tarsus of Eryops is much like that of the Theromorph reptiles. See Proceeds. Amer. Philos. Soc., 1884, p. 38.

There are several groups which show especial marks of degeneracy. Such are the reduced maxillary bones and persistent gills of the Proteïda; the absence of the maxillary bones and the presence of gills in the Trachystomata; the loss of a pair of legs and feebleness of the remaining pair in the sirens; and the extreme reduction of the limbs in Amphiuma. Such I must also regard, with Lankester, the persistent branchiæ of the Siredons. I may add that in the brain of the Proteïd Necturus the hemispheres are relatively larger than in the Anura, which are at the end of the line.

It must be concluded, then, that in many respects, the Batrachia have undergone degeneracy with the passage of time.

VI. THE REPTILIAN LINE.

As in the case of the Batrachia, the easiest way of obtaining a general view of the history of this class is by throwing their principal structural characters into a tabular form. As in the case of that class I commence with the oldest forms and end with the latest in the order of time, which, as usual, corresponds with the order of structure. I except from this the first order, the Ichthyopterygia, which we do not know prior to the Triassic period:[1]

A. Extremities not differentiated in form beyond proximal segment.
I. Os quadratum immovably articulated to squamosal, etc.
Tubercular and capitular rib articulations present and distinct. . . 1. *Ichthyopterygia.*
AA. Elements of extremities differentiated.

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[1] Generally similar to the system published by me. Proceedings Amer. Ass. Adv. Science, XIX, p. 233.

II. Os quadratum immovably articulated; capitular and tubercular rib-articulations distinct. Archosauria.

Pubis and ischium united, and with little or no obturator foramen; one posterior cranial arch; limbs ambulatory; a procoracoid .... 2. *Theromorpha*

Ischium and pubis distinct, the latter directed forwards, backwards or downwards; two posterior cranial arches; limbs ambulatory; no procoracoid . 3. *Dinosauria.*[1]

Ischium and pubis united; two postcranial arches; anterior limbs volant 4. *Ornithosauria.*

III. Os quadratum closely united to cranial arches; but one rib-articulation. Synaptosauria.

Distinct hyposternal and postabdominal bones; ribs joining each two vertebræ, and generally forming a carapace; one posterior cranial arch...... 5. *Testudinata.*

Hyposternal and postabdominal bones not distinct; two posterior cranial arches; ribs attached to one vertebra; a sternum; ? no procoracoid 6. *Rhynchocephalia.*

Hyposternal and postabdominal bones not distinct; two posterior cranial arches; ribs attached to one centrum; no sternum[2]; a procoracoid ...7. *Sauropterygia.*

IV. Os quadratum attached only at the proximal extremity, and more or less movable; ribs with one head. Streptostylica.[3]

Brain case membranous in front of proötic bone; trabecula not persistent 8. *Lacertilia.*

Brain case with osseous walls anterior to proötic; a scapular arch and sternum 9. *Pythonomorpha.*[4]

Brain case with osseous walls anterior to proötic; no scapular arch nor sternum; trabecular grooves of sphenoid and presphenoid bones........... 10. *Ophidia.*

An inspection of the characters of these ten orders, and their consideration in connection with their geological history will give a definite idea as to the character of their evolution. The history of the class, and therefore the discussion of the question, is limited in time to the period which has elapsed since the Permian epoch inclusive, for it is then that the Reptilia enter the field of our knowledge. During this period but one order of reptiles inhabited the earth, so far as now known, that of the Theromorpha. The important character and role of this type may be inferred from the fact that they are structurally nearer to both the Batrachia and the Mammalia than any other, but present characters which render it probable that all the other reptiles, with possibly the exception of the

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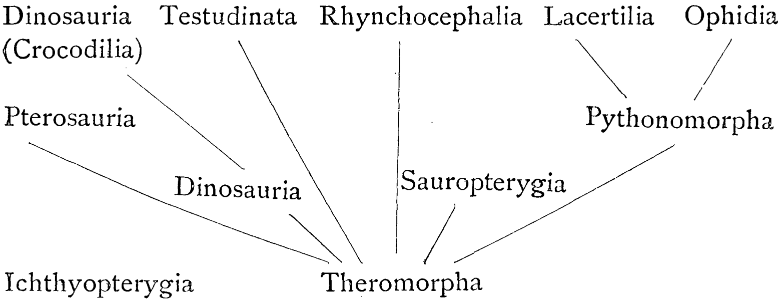
[1] This definition includes the Crocodilia in the Dinosauria, as it is absolutely connected with the typical Dinosaurs by the Opisthocœla (Sauropoda Marsh).

[2] Episternum present.

[3] It is quite possible that the three divisions ot this head form one natural order, the Streptostylica, or Squamata.

[4] Including Choristodera, see AMERICAN NATURALIST, 1884, p. 815.

Ichthyopterygia, derived their being from them. The phylogeny may be thus expressed:



(To be continued.)

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ON THE LARVAL FORMS OF SPIRORBIS BOREALIS DAUDIN.

BY J. WALTER FEWKES.

NATURALISTS who are engaged in the identification of the larval forms which marine animals pass through in their growth from the egg, find great difficulty in this study from the lack of direct observations in raising these larvæ from the eggs or in rearing them directly into the adult. This is particularly true in regard to the young of marine annelids, a most profitable field for new observations and one which has had but few cultivators among American naturalists. The following paper is offered as a help to those engaged in this study and not as an extended account of the embryology of the animal of which it treats. It is especially intended for those who are interested in the identification of our marine annelid larvæ.[1]

A genus of chætopod annelids called Spirorbis, as is well known, in its adult and older larval stages, secretes a coiled calcareous case, commonly called its shell, in which it lives. This case is permanently cemented or attached to some foreign body, from which fact the adult is incapable of locomotion. Not so, however, the larva, which is destitute of any such shell, is not fixed but is free swimming, and often captured with the dip-net in surface fishing. From the great dissimilarity in outward form as

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[1] The observations here recorded were made in the Zoölogical Laboratory at Newport, R. I. I am indebted to Mr. A. Agassiz for facilities to carry on my studies at that place.